# SPEC® CPU2017 Floating Point Rate Result

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## Supermicro
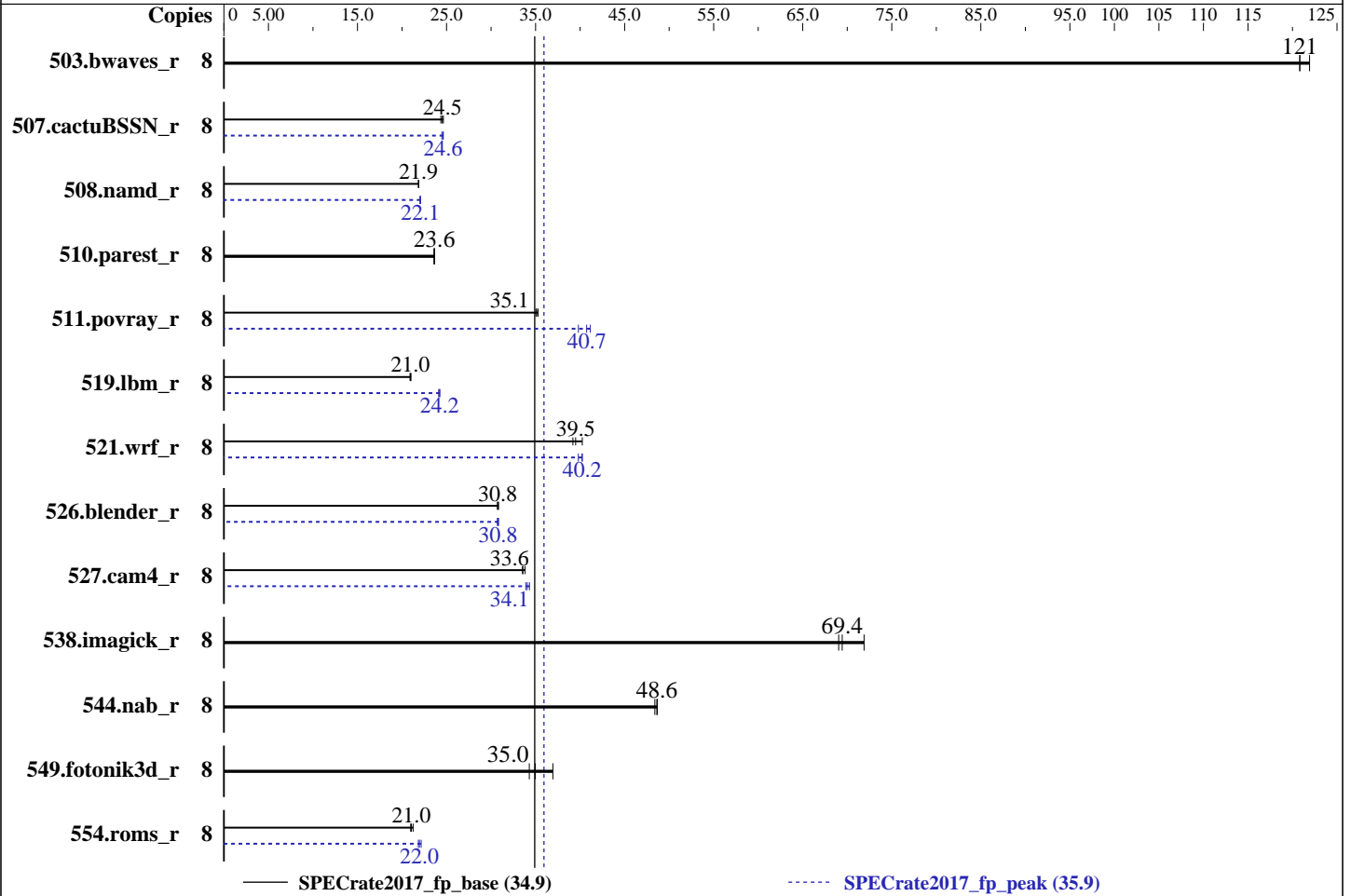
SuperWorkstation 5039A-i (X11SRA , Intel Xeon W-2123)

SPECrate2017_fp_base =   34.9

SPECrate2017_fp_peak =   35.9

**CPU2017 License:** 001176
**Test Sponsor:** Supermicro
**Tested by:** Supermicro

**Test Date:** Sep-2018
**Hardware Availability:** Jul-2017
**Software Availability:** Mar-2018

| Copies | | |
|---|---|---|
| 503.bwaves_r | 8 | 121 |
| 507.cactuBSSN_r | 8 | 24.5 / 24.6 |
| 508.namd_r | 8 | 21.9 / 22.1 |
| 510.parest_r | 8 | 23.6 |
| 511.povray_r | 8 | 35.1 / 40.7 |
| 519.lbm_r | 8 | 21.0 / 24.2 |
| 521.wrf_r | 8 | 39.5 / 40.2 |
| 526.blender_r | 8 | 30.8 / 30.8 |
| 527.cam4_r | 8 | 33.6 / 34.1 |
| 538.imagick_r | 8 | 69.4 |
| 544.nab_r | 8 | 48.6 |
| 549.fotonik3d_r | 8 | 35.0 |
| 554.roms_r | 8 | 21.0 / 22.0 |

——— SPECrate2017_fp_base (34.9)          - - - - - SPECrate2017_fp_peak (35.9)

## Hardware

CPU Name:   Intel Xeon W-2123
 Max MHz.:   3900
 Nominal:   3600
Enabled:   4 cores, 1 chip, 2 threads/core
Orderable:   1 chip
Cache L1:   32 KB I + 32 KB D on chip per core
 L2:   1 MB I+D on chip per core
 L3:   8.25 MB I+D on chip per chip
 Other:   None
Memory:   64 GB (4 x 16 GB 2Rx8 PC4-2666V-E)
Storage:   1 x 200 GB SATA III SSD
Other:   None

## Software

OS:   SUSE Linux Enterprise Server 12 SP3 (x86_64)
   Kernel 4.4.114-94.11-default
Compiler:   C/C++: Version 18.0.2.199 of Intel C/C++
   Compiler for Linux;
   Fortran: Version 18.0.2.199 of Intel Fortran
   Compiler for Linux
Parallel:   No
Firmware:   Supermicro BIOS version 1.2 released Aug-2018
File System:   xfs
System State:   Run level 3 (multi-user)
Base Pointers:   64-bit
Peak Pointers:   64-bit
Other:   None

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| | |
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## Results Table

| Benchmark | Base | | | | | | Peak | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
| 503.bwaves_r | 8 | 658 | 122 | 664 | 121 | **664** | **121** | 8 | 658 | 122 | 664 | 121 | **664** | **121** |
| 507.cactuBSSN_r | 8 | **413** | **24.5** | 416 | 24.4 | 411 | 24.6 | 8 | 414 | 24.5 | **412** | **24.6** | 411 | 24.6 |
| 508.namd_r | 8 | **348** | **21.9** | 348 | 21.8 | 347 | 21.9 | 8 | 344 | 22.1 | **345** | **22.1** | 345 | 22.0 |
| 510.parest_r | 8 | 885 | 23.6 | 887 | 23.6 | **886** | **23.6** | 8 | 885 | 23.6 | 887 | 23.6 | **886** | **23.6** |
| 511.povray_r | 8 | 533 | 35.0 | 530 | 35.3 | **532** | **35.1** | 8 | 454 | 41.1 | **459** | **40.7** | 469 | 39.8 |
| 519.lbm_r | 8 | 403 | 20.9 | **402** | **21.0** | 401 | 21.0 | 8 | **348** | **24.2** | 348 | 24.2 | 350 | 24.1 |
| 521.wrf_r | 8 | 445 | 40.2 | 457 | 39.2 | **454** | **39.5** | 8 | 445 | 40.2 | 450 | 39.8 | **446** | **40.2** |
| 526.blender_r | 8 | 395 | 30.8 | **396** | **30.8** | 397 | 30.7 | 8 | 397 | 30.7 | **396** | **30.8** | 395 | 30.8 |
| 527.cam4_r | 8 | 414 | 33.8 | **417** | **33.6** | 417 | 33.5 | 8 | **411** | **34.1** | 413 | 33.9 | 408 | 34.3 |
| 538.imagick_r | 8 | 288 | 69.0 | **287** | **69.4** | 277 | 71.9 | 8 | 288 | 69.0 | **287** | **69.4** | 277 | 71.9 |
| 544.nab_r | 8 | 277 | 48.7 | **277** | **48.6** | 278 | 48.4 | 8 | 277 | 48.7 | **277** | **48.6** | 278 | 48.4 |
| 549.fotonik3d_r | 8 | 909 | 34.3 | 844 | 36.9 | **891** | **35.0** | 8 | 909 | 34.3 | 844 | 36.9 | **891** | **35.0** |
| 554.roms_r | 8 | 598 | 21.2 | **604** | **21.0** | 606 | 21.0 | 8 | 582 | 21.8 | 574 | 22.1 | **579** | **22.0** |
| **SPECrate2017_fp_base =** | **34.9** | | | | | | | | | | | |
| **SPECrate2017_fp_peak =** | **35.9** | | | | | | | | | | | |

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

## Submit Notes

```
The taskset mechanism was used to bind copies to processors. The config file option 'submit'
was used to generate taskset commands to bind each copy to a specific processor.
For details, please see the config file.
```

## Operating System Notes

```
Stack size set to unlimited using "ulimit -s unlimited"
```

## General Notes

```
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-32:/home/cpu2017/je5.0.1-64"

 Binaries compiled on a system with 1x Intel Core i7-6700K CPU + 32GB RAM
 memory using Redhat Enterprise Linux 7.5
 Transparent Huge Pages enabled by default
 Prior to runcpu invocation
 Filesystem page cache synced and cleared with:
 sync; echo 3>        /proc/sys/vm/drop_caches

 Yes: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)
 is mitigated in the system as tested and documented.
 Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1)
```

**(Continued on next page)**

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## Supermicro

SuperWorkstation 5039A-i (X11SRA , Intel Xeon W-2123)

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## General Notes (Continued)

is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2)
is mitigated in the system as tested and documented.

## Platform Notes

```
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-k7zv Sat Sep 22 01:26:45 2018

SUT (System Under Test) info as seen by some common utilities.
For more information on this section, see
   https://www.spec.org/cpu2017/Docs/config.html#sysinfo

From /proc/cpuinfo
   model name : Intel(R) Xeon(R) W-2123 CPU @ 3.60GHz
      1  "physical id"s (chips)
      8 "processors"
   cores, siblings (Caution: counting these is hw and system dependent. The following
   excerpts from /proc/cpuinfo might not be reliable.  Use with caution.)
      cpu cores : 4
      siblings  : 8
      physical 0: cores 0 1 4 5

From lscpu:
   Architecture:        x86_64
   CPU op-mode(s):      32-bit, 64-bit
   Byte Order:          Little Endian
   CPU(s):              8
   On-line CPU(s) list: 0-7
   Thread(s) per core:  2
   Core(s) per socket:  4
   Socket(s):           1
   NUMA node(s):        1
   Vendor ID:           GenuineIntel
   CPU family:          6
   Model:               85
   Model name:          Intel(R) Xeon(R) W-2123 CPU @ 3.60GHz
   Stepping:            4
   CPU MHz:             1700.000
   CPU max MHz:         3601.0000
   CPU min MHz:         1200.0000
   BogoMIPS:            7199.77
   Virtualization:      VT-x
   L1d cache:           32K
   L1i cache:           32K
```

**(Continued on next page)**

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## Platform Notes (Continued)

```
       L2 cache:             1024K
       L3 cache:             8448K
       NUMA node0 CPU(s):    0-7
       Flags:                fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
    pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp
    lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc
    aperfmperf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
    fma cx16 xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
    xsave avx f16c rdrand lahf_lm abm 3dnowprefetch ida arat epb invpcid_single pln pts
    dtherm intel_pt rsb_ctxsw spec_ctrl retpoline kaiser tpr_shadow vnmi flexpriority
    ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx
    avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt
    xsavec xgetbv1 cqm_llc cqm_occup_llc

 /proc/cpuinfo cache data
    cache size : 8448 KB

 From numactl --hardware  WARNING: a numactl 'node' might or might not correspond to a
 physical chip.
   available: 1 nodes (0)
   node 0 cpus: 0 1 2 3 4 5 6 7
   node 0 size: 64120 MB
   node 0 free: 53820 MB
   node distances:
   node   0
     0:  10

 From /proc/meminfo
    MemTotal:       65659404 kB
    HugePages_Total:        0
    Hugepagesize:       2048 kB

 From /etc/*release* /etc/*version*
    SuSE-release:
      SUSE Linux Enterprise Server 12 (x86_64)
      VERSION = 12
      PATCHLEVEL = 3
      # This file is deprecated and will be removed in a future service pack or release.
      # Please check /etc/os-release for details about this release.
    os-release:
      NAME="SLES"
      VERSION="12-SP3"
      VERSION_ID="12.3"
      PRETTY_NAME="SUSE Linux Enterprise Server 12 SP3"
      ID="sles"
      ANSI_COLOR="0;32"
      CPE_NAME="cpe:/o:suse:sles:12:sp3"
```

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## Platform Notes (Continued)

```
  uname -a:
     Linux linux-k7zv 4.4.114-94.11-default #1 SMP Thu Feb 1 19:28:26 UTC 2018 (4309ff9)
     x86_64 x86_64 x86_64 GNU/Linux

  Kernel self-reported vulnerability status:

  CVE-2017-5754 (Meltdown):          Mitigation: PTI
  CVE-2017-5753 (Spectre variant 1): Mitigation: Barriers
  CVE-2017-5715 (Spectre variant 2): Mitigation: IBRS+IBPB

  run-level 3 Sep 21 17:38

  SPEC is set to: /home/cpu2017
     Filesystem      Type  Size  Used Avail Use% Mounted on
     /dev/sda4       xfs   145G   25G  120G  18% /home

  Additional information from dmidecode follows.  WARNING: Use caution when you interpret
  this section. The 'dmidecode' program reads system data which is "intended to allow
  hardware to be accurately determined", but the intent may not be met, as there are
  frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.
    BIOS American Megatrends Inc. 1.2 08/23/2018
    Memory:
     4x Micron 18ADF2G72AZ-2G6H1R 16 GB 2 rank 2666
     4x NO DIMM NO DIMM

  (End of data from sysinfo program)
```

## Compiler Version Notes

```
==============================================================================
  CC  519.lbm_r(base) 538.imagick_r(base, peak) 544.nab_r(base, peak)
------------------------------------------------------------------------------
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------


==============================================================================
  CC   519.lbm_r(peak)
------------------------------------------------------------------------------
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------


==============================================================================
  CXXC 508.namd_r(base) 510.parest_r(base, peak)
```

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## Compiler Version Notes (Continued)

```
------------------------------------------------------------------------------
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------


==============================================================================
CXXC 508.namd_r(peak)
------------------------------------------------------------------------------
icpc (ICC) 18.0.2 20180210
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------------------------------------------------------------------------------


==============================================================================
 CC  511.povray_r(base) 526.blender_r(base, peak)
------------------------------------------------------------------------------
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------


==============================================================================
CC   511.povray_r(peak)
------------------------------------------------------------------------------
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icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------


==============================================================================
 FC  507.cactuBSSN_r(base, peak)
------------------------------------------------------------------------------
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------


==============================================================================
 FC  503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak) 554.roms_r(base)
------------------------------------------------------------------------------
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------
```

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## Compiler Version Notes (Continued)

```
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FC   554.roms_r(peak)
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------------------------------------------------------------------------------


==============================================================================
 CC   521.wrf_r(base) 527.cam4_r(base)
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------------------------------------------------------------------------------


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CC   521.wrf_r(peak) 527.cam4_r(peak)
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icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------
```

## Base Compiler Invocation

C benchmarks:
```
icc -m64 -std=c11
```

C++ benchmarks:
```
icpc -m64
```

Fortran benchmarks:
```
ifort -m64
```

Benchmarks using both Fortran and C:
```
ifort -m64 icc -m64 -std=c11
```

Benchmarks using both C and C++:
```
icpc -m64 icc -m64 -std=c11
```

Benchmarks using Fortran, C, and C++:
```
icpc -m64 icc -m64 -std=c11 ifort -m64
```

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# Base Portability Flags

503.bwaves_r: -DSPEC_LP64
507.cactuBSSN_r: -DSPEC_LP64
508.namd_r: -DSPEC_LP64
510.parest_r: -DSPEC_LP64
511.povray_r: -DSPEC_LP64
519.lbm_r: -DSPEC_LP64
521.wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
526.blender_r: -DSPEC_LP64 -DSPEC_LINUX -funsigned-char
527.cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG
538.imagick_r: -DSPEC_LP64
544.nab_r: -DSPEC_LP64
549.fotonik3d_r: -DSPEC_LP64
554.roms_r: -DSPEC_LP64

# Base Optimization Flags

C benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

Fortran benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs

Benchmarks using both Fortran and C:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs

Benchmarks using both C and C++:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

Benchmarks using Fortran, C, and C++:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs

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## Peak Compiler Invocation

C benchmarks:
```
icc -m64 -std=c11
```

C++ benchmarks:
```
icpc -m64
```

Fortran benchmarks:
```
ifort -m64
```

Benchmarks using both Fortran and C:
```
ifort -m64 icc -m64 -std=c11
```

Benchmarks using both C and C++:
```
icpc -m64 icc -m64 -std=c11
```

Benchmarks using Fortran, C, and C++:
```
icpc -m64 icc -m64 -std=c11 ifort -m64
```

## Peak Portability Flags

```
Same as Base Portability Flags
```

## Peak Optimization Flags

C benchmarks:

 519.lbm_r: `-prof-gen`(pass 1) `-prof-use`(pass 2) `-ipo -xCORE-AVX2 -O3`
`-no-prec-div -qopt-prefetch -ffinite-math-only`
`-qopt-mem-layout-trans=3`

 538.imagick_r: `basepeak = yes`

 544.nab_r: `basepeak = yes`

C++ benchmarks:

 508.namd_r: `-prof-gen`(pass 1) `-prof-use`(pass 2) `-ipo -xCORE-AVX2 -O3`
`-no-prec-div -qopt-prefetch -ffinite-math-only`
`-qopt-mem-layout-trans=3`

 510.parest_r: `basepeak = yes`

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## Peak Optimization Flags (Continued)

Fortran benchmarks:

503.bwaves_r: `basepeak = yes`

549.fotonik3d_r: `basepeak = yes`

554.roms_r: `-prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs`

Benchmarks using both Fortran and C:
`-prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs`

Benchmarks using both C and C++:

511.povray_r: `-prof-gen(pass 1) -prof-use(pass 2) -ipo -xCORE-AVX2 -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3`

526.blender_r: `-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3`

Benchmarks using Fortran, C, and C++:
`-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs`

---

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-12-21.html
http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-BSF-revA.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-12-21.xml
http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-BSF-revA.xml

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For questions about this result, please contact the tester.  For other inquiries, please contact info@spec.org.

Tested with SPEC CPU2017 v1.0.5 on 2018-09-21 13:26:45-0400.
Report generated on 2018-10-31 19:08:00 by CPU2017 PDF formatter v6067.
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